

silver. The fact which I have noticed, of the alkaline reaction of the blood after as much as a drachm of glacial phosphoric acid had been injected into the veins, affords a striking instance of the manner in which the chemical properties of a substance may be masked or changed when brought into contact with the living fluids and solids.

The action of the baryta group on the muscles of animal life, is in curious contrast with their action on the heart, the irritability of which they completely destroy, whilst the voluntary muscles continue contracting for many minutes after death.

It seems, from the foregoing observations, that, independently of the interest that many of the facts recorded may possess, in a physiological point of view, a closer analysis of the action of those substances on the different organs of the body, and on the blood, affords additional proof of the existence of the law connecting the physiological action of these inorganic compounds with their isomorphous relations. Considering the imperfect state of our knowledge as regards the isomorphous relations of the elements, it is surprising that more exceptions to this law have not presented themselves in so extended a series of experiments; and I have but little doubt, that those which have been remarked, will disappear before a more perfect knowledge of the molecular properties of matter, on which, I think, physiological experiments are destined to throw light.

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ART. VI.—*An Analysis of the Cases of Delirium Tremens, admitted into the Bloomingdale Asylum for the Insane, from June 16th, 1821, to December 31st, 1844.* By PLINY EARLE, M.D., present Physician to the Asylum.

DURING the whole period of its existence, the Bloomingdale Asylum has been made the receptacle, not for cases of insanity proper, alone, but also for persons labouring under delirium tremens, as well as for some, who, although not attacked with this disease, were addicted to the habitual and excessive use of intoxicating liquors. These persons are not, strictly speaking, proper subjects for an asylum for the insane; but as there is no institution in the vicinity of New York particularly devoted to them, and no other place so well adapted to their treatment and temporary seclusion from the source of their disorder, this establishment almost necessarily became, in the hope of a reformation, their place of refuge.

The aggregate number of cases of this kind, admitted previously to the 31st December, 1844, is 594; of which 511 were males, and 83 females. But this number includes many readmissions of the same individuals. In the subjoined table these cases are arranged according to their several admissions and readmissions.

|                  | Males. | Females. | Total. |                        | Males. | Females. | Total. |
|------------------|--------|----------|--------|------------------------|--------|----------|--------|
| First admission, | 274    | 48       | 322    | Ninth admission,       | 5      | 0        | 5      |
| Second "         | 85     | 17       | 102    | Tenth "                | 5      | 0        | 5      |
| Third "          | 42     | 7        | 49     | Eleventh "             | 5      | 0        | 5      |
| Fourth "         | 29     | 4        | 33     | Twelfth "              | 3      | 0        | 3      |
| Fifth "          | 20     | 3        | 23     | Thirteenth "           | 2      | 0        | 2      |
| Sixth "          | 14     | 2        | 16     | Fourteenth "           | 2      | 0        | 2      |
| Seventh "        | 8      | 2        | 10     | From 15th to 26th,     |        |          |        |
| Eighth "         | 5      | 0        | 5      | each one admission, 12 |        | 0        | 12     |
|                  |        |          |        | Total                  | 511    | 83       | 594    |

Thus, the whole number of *persons* was 322. To these, and to their disease on their first admission, our investigations must for the present be confined. The years in which they were respectively first admitted, are indicated in the following table.

|      | Males. | Females. | Total. |       | Males. | Females. | Total. |
|------|--------|----------|--------|-------|--------|----------|--------|
| 1821 | 14     |          | 14     | 1833  | 17     | 1        | 18     |
| 1822 | 19     | 3        | 22     | 1834  | 11     | 1        | 12     |
| 1823 | 14     | 4        | 18     | 1835  | 5      | 3        | 8      |
| 1824 | 17     |          | 17     | 1836  | 12     | 1        | 13     |
| 1825 | 24     | 3        | 27     | 1837  | 13     | 1        | 14     |
| 1826 | 20     | 5        | 25     | 1838  | 9      | 6        | 15     |
| 1827 | 14     | 5        | 19     | 1839  | 4      | 1        | 5      |
| 1828 | 11     | 2        | 13     | 1840  | 5      | 2        | 7      |
| 1829 | 12     |          | 12     | 1841  | 6      | 1        | 7      |
| 1830 | 9      | 4        | 13     | 1842  | 2      | 2        | 4      |
| 1831 | 14     | 1        | 15     | 1843  | 4      | 1        | 5      |
| 1832 | 12     | 1        | 13     | 1844  | 6      |          | 6      |
|      |        |          |        | Total | 274    | 48       | 322    |

In the earlier years of the institution, as will be perceived by this schedule, there were many more victims to intemperance received, than at a later period, although the population of the city, the principal source of these patients, was more than doubled during the series of years embraced in these statistics. This fact may undoubtedly be in part attributed to the improved habits of the community, resulting from the interest awakened in the cause of temperance.

The sexes being distinguished in the foregoing table, it will be perceived that there were 274 males and 48 females; the former exceeding the latter in the proportion of nearly six to one.

Of these 322 patients, the countries of nativity of 273, and those of residence, at the time of admission, of 295, are recorded. They are as follows :

| Nativity.       |     |    |     |                 |     |    | Residence. |                   |     |    |     |
|-----------------|-----|----|-----|-----------------|-----|----|------------|-------------------|-----|----|-----|
| State.          | M.  | F. | T.  | Country.        | M.  | F. | T.         | State or County.  | M.  | F. | T.  |
| New York        | 137 | 15 | 152 | Ireland         | 32  | 13 | 45         | N. York           | 237 | 39 | 276 |
| Connecticut     | 10  | 1  | 11  | England         | 14  | 6  | 20         | N. Jersey         | 0   | 0  | 6   |
| New Jersey      | 9   | 0  | 9   | Scotland        | 7   | 1  | 8          | Massachusetts     | 4   | 0  | 4   |
| Massachusetts   | 7   | 1  | 8   | France          | 2   | 1  | 3          | Connecticut       | 3   | 0  | 3   |
| Pennsylvania    | 2   | 1  | 3   | Nova Scotia     | 1   | 1  | 2          | Pennsylvania      | 0   | 1  | 1   |
| Maryland        | 2   | 0  | 2   | Wales           | 1   | 0  | 1          | Virginia          | 0   | 1  | 1   |
| Virginia        | 2   | 0  | 2   | Germany         | 1   | 0  | 1          | Louisiana         | 1   | 0  | 1   |
| Maine           | 2   | 0  | 2   | Sweden          | 1   | 0  | 1          | Michigan          | 1   | 0  | 1   |
| N. Hampshire    | 0   | 1  | 1   |                 |     |    |            | Canada            | 1   | 0  | 1   |
| Rhode Island    | 1   | 0  | 1   | For. Foreigners | 59  | 22 | 81         | Dist. of Columbia | 0   | 1  | 1   |
| S. Carolina     | 0   | 1  | 1   |                 |     |    |            |                   |     |    |     |
| Total U. States | 172 | 20 | 192 | Total U. States | 172 | 20 | 192        | Total             | 253 | 42 | 295 |
|                 |     |    |     | Aggregate       | 231 | 42 | 273        |                   |     |    |     |

It appears that 152, or 55 per cent., of the whole, were born in the State of New York; and 40, or 14 per cent., were natives of other States of the Union. Of foreigners there were 81, which is equal to 30 per cent.

Persons labouring under delirium tremens are rarely carried to a great distance for treatment. This is rendered inconvenient, and generally impossible, both by the condition of the patient, and the duration of the disease.

Hence it is not surprising that, of 295 individuals admitted, no less than 276 resided in this state, and a very large proportion of these in the city of

New York. Of the 19, whose residence was in other States and in Canada, several were sojourning in this city when attacked with the disorder for the cure of which they were brought to the Asylum.

The profession or occupation of 238 men is exhibited in the subjoined list. An attempt has been made to classify them according to the peculiar nature of their several employments.

| 1. <i>Mercantile.</i>        |    | 7. <i>Active employment within doors.</i> |    |
|------------------------------|----|---|----|
| Merehants and Traders,       | 50 | Brush maker,                              | 1  |
| Clerks,                      | 25 | Comb maker,                               | 1  |
| Druggists,                   | 3  | Leather dressers,                         | 5  |
| Manufacturers,               | 2  | Carpenter,                                | 1  |
| 2. <i>Professional.</i>      |    | Cooper,                                   | 1  |
| Physicians,                  | 2  | Chair makers,                             | 2  |
| Medical Students,            | 2  | Collector of Taxes,                       | 1  |
| Lawyers,                     | 19 | Clothier,                                 | 1  |
| Student of Law,              | 1  | Silk printer,                             | 1  |
| Artist,                      | 1  | Book binder,                              | 1  |
| Architect,                   | 1  | Nail maker,                               | 1  |
| 3. <i>Dealers in Liquor.</i> |    | Gilder,                                   | 1  |
| Tavern Keepers,              | 3  | Actor,                                    | 1  |
| Grocers,                     | 14 | Printer,                                  | 1  |
| Brewer,                      | 1  | Silversmith,                              | 1  |
| 4. <i>Mariners.</i>          |    | Coppersmith,                              | 1  |
| Naval Officers,              | 2  | Upholsterer,                              | 1  |
| Sailors,                     | 11 | Circus rider,                             | 1  |
| Sea Captains,                | 3  | 8. <i>Active employment out of doors.</i> |    |
| Pilot,                       | 1  | Farmers,                                  | 8  |
| 5. <i>Exposed to Heat.</i>   |    | Laborers,                                 | 6  |
| Iron-sonader,                | 1  | Carimen,                                  | 3  |
| Blacksmiths,                 | 2  | Pavier,                                   | 1  |
| Engineer,                    | 1  | Painters,                                 | 2  |
| Glass-blower,                | 1  | Masons,                                   | 4  |
| Bakers,                      | 3  | Butchers,                                 | 2  |
| Hauer,                       | 1  | Peddlers,                                 | 2  |
| 6. <i>Sedentary.</i>         |    | Cider maker,                              | 1  |
| Sail maker,                  | 1  | Stage driver,                             | 1  |
| Shoe makers,                 | 2  | Soldier,                                  | 1  |
| Watch maker,                 | 1  | Musician,                                 | 1  |
| Tailors,                     | 4  | 9. <i>No Occupation.</i>                  |    |
| Saddler,                     | 1  | Men of leisure, and young men without     | 23 |
| Carpet weaver,               | 1  | employment,                               |    |

Merchants, traders, clerks, professional men, persons of leisure, and young men without employment, furnish 129, or 10 more than one-half of the 238 patients here recorded. Without explanation, the necessary inference must be far from flattering to these classes. It must be recollected, however, that they constitute no unimportant proportion of the population of the commercial and wealthy city of New York. They are, moreover, those classes, the members of which, more generally than those of other portions of the population, resort to this institution when thus diseased. The great majority of persons whose pecuniary resources are limited, are taken to places where the expenses are less.

*Table showing the Ages of 254 Patients.*

| Sex.     | Under 20 years. | From 20 to 30. | From 30 to 40. | From 40 to 50. | From 50 to 60. | From 60 to 70. | Total. |
|----------|-----------------|----------------|----------------|----------------|----------------|----------------|--------|
| Males,   | 3               | 77             | 81             | 36             | 10             | 5              | 212    |
| Females, | 0               | 8              | 19             | 7              | 6              | 2              | 42     |
|          | 3               | 85             | 100            | 43             | 16             | 7              | 254    |

The decennium in which there was the greatest number, is that from 30 to 40 years. The next is that from 20 to 30; and the third, that from 40 to 50.

In the community at large, there is a much greater number of persons between 20 and 30 years of age, than in any decennium of more advanced life. Hence the proportionate number of these patients between 30 and 40 years, as compared with the living population of the corresponding age, is much greater than that in any other period of existence.

The civil or social condition of 286 patients is indicated by the following table:—

| Condition. | Males. | Females. | Total. |
|------------|--------|----------|--------|
| Single,    | 122    | 1        | 123    |
| Married,   | 115    | 37       | 152    |
| Widowed,   | 4      | 7        | 11     |
| Total      | 241    | 45       | 286    |

The number of unmarried men exceeds that of the married by seven; although, if the widowed be included with the latter division, the single predominate over the married by but *three*.

This approximation to equality of numbers in the classes of celibacy and matrimony, though so strikingly remarkable with the men, does not obtain with the women. Of the latter sex, the married exceed the unmarried in the proportion of thirty-seven to one; or, if the widowed be included with the married, in the proportion of forty-four to one.

#### *Result of Treatment.*

| Condition.     | Males. | Females. | Total. |
|----------------|--------|----------|--------|
| Cured,         | 244    | 42       | 286    |
| Much improved, | 1      | 0        | 1      |
| Improved,      | 0      | 3        | 3      |
| Relieved,      | 1      | 0        | 1      |
| Unimproved,    | 5      | 2        | 7      |
| Eloped,        | 2      | 0        | 2      |
| Died,          | 19     | 1        | 20     |
| Remains,       | 2      | 0        | 2      |
| Total          | 274    | 48       | 322    |

As a general rule, delirium tremens soon terminates either in recovery or death.

Considering the severity of the disease, it is imminently curable. Thus, of 322 patients, 286 were cured, and but 20 died. The two still remaining in the house are also cured.

It is proper to remark, as has already been intimated, that, in some of these cases, the patient had no delirium while at the Asylum. Among them were a few in each of the various conditions and phases, both temporary and more prolonged, of intoxication.

The rapidity with which the delirium approaches its crisis, in fatal cases, is well illustrated by the following table, indicating the term of residence at the Asylum of each patient who died.

| Time in Asylum. | M. | F. | Total. | Time in Asylum. | M. | F. | Total. |
|-----------------|----|----|--------|-----------------|----|----|--------|
| 1 day           | 2  | 0  | 2      | Brought up      | 14 | 1  | 15     |
| 2 days          | 2  | 1  | 3      | 10 days         | 1  | 0  | 1      |
| 3 "             | 2  | 0  | 2      | 12 "            | 1  | 0  | 1      |
| 4 "             | 5  | 0  | 5      | 13 "            | 1  | 0  | 1      |
| 5 "             | 1  | 0  | 1      | 27 "            | 1  | 0  | 1      |
| 7 "             | 1  | 0  | 1      | 1 month 22 "    | 1  | 0  | 1      |
| 9 "             | 1  | 0  | 1      |                 |    |    |        |
| Carried up      | 14 | 1  | 15     | Total           | 19 | 1  | 20     |

In 12 of these 20 cases, the patient died within 4 days from the time of his reception into the asylum; and all of them, excepting one, within 27 days. The man who remained one month and 22 days, died of congestive fever.

The death of the man who died on the ninth day, was the result of an attempt at suicide, by cutting his throat, before admission. This was also the case with one of the men who died on the fourth day. One of the men committed suicide while in the asylum.

#### RE-ADMISSIONS.

*Second Admissions.*—Of the 322 persons before mentioned, 85 males and 17 females, a total of 102, were admitted a second time, and discharged as follows:

|               | Males. | Females. | Total. |                  | Males. | Females. | Total. |
|---------------|--------|----------|--------|------------------|--------|----------|--------|
| Cured         | 74     | 15       | 89     | Brought up       | 82     | 17       | 99     |
| Much improved | 1      | 0        | 1      | Died             | 1      | 0        | 1      |
| Improved      | 2      | 0        | 2      | By Habeas Corpus | 1      | 0        | 1      |
| Unimproved    | 3      | 2        | 5      | Not stated       | 1      | 0        | 1      |
| Eloped        | 2      | 0        | 2      |                  |        |          |        |
| Carried up    | 82     | 17       | 99     | Total            | 85     | 17       | 102    |

*Third Admissions.*—42 males and 7 females, making an aggregate of 49, were each admitted a third time. They were discharged as follows:—

|            | Males. | Females. | Total. |
|------------|--------|----------|--------|
| Cured      | 36     | 6        | 42     |
| Improved   | 3      | 1        | 4      |
| Unimproved | 1      | 0        | 1      |
| Eloped     | 1      | 0        | 1      |
| Died       | 1      | 0        | 1      |
| Total      | 42     | 7        | 49     |

*Fourth Admissions.*—Of the fourth admissions there are 33; of whom 29 are males, and 4 females, who left the asylum as follows:

|            | Males. | Females. | Total. |
|------------|--------|----------|--------|
| Cured      | 21     | 4        | 25     |
| Improved   | 1      | 0        | 1      |
| Unimproved | 3      | 0        | 3      |
| Eloped     | 3      | 0        | 3      |
| Died       | 1      | 0        | 1      |
| Total      | 29     | 4        | 33     |

*Fifth Admissions.*—23 were received a fifth time each. Of these, 20 were males and three females. Discharged as follows:

|            | Males. | Females. | Total. |
|------------|--------|----------|--------|
| Cured      | 16     | 3        | 19     |
| Unimproved | 2      | 0        | 2      |
| Eloped     | 1      | 0        | 1      |
| Died       | 1      | 0        | 1      |
| Total      | 20     | 3        | 23     |

*Sixth Admissions.*—The sixth admissions consist of 14 males and two females; total sixteen. Of these, there were

|            | Males. | Females. | Total. |
|------------|--------|----------|--------|
| Cured      | 12     | 2        | 14     |
| Unimproved | 2      | 0        | 2      |
| Total      | 14     | 2        | 16     |

*Seventh Admissions.*—Eight males and 2 females were each admitted a seventh time, and discharged as follows :

|            | Males. | Females. | Total. |
|------------|--------|----------|--------|
| Cured      | 6      | 1        | 7      |
| Unimproved | 1      | 0        | 1      |
| Died       | 0      | 1        | 1      |
| Remain     | 1      | 0        | 1      |
| Total      | 8      | 2        | 10     |

*Admissions subsequent to the seventh.*—No female was received more than seven times. The admissions of a higher number were exclusively of males. A succinct account of them is contained in the following schedule.

|   |  |
|---|--|
| 5 | were received 8 times each, and discharged, 4 cured, 1 improved. |
| 5 | " 9 " " " 4 " 1 eloped.  |
| 5 | " 10 " " " 4 " 1 improved.                                       |
| 5 | " 11 " " " 5 "   |
| 3 | " 12 " " " 3 "   |
| 2 | " 13 " " " 2 "   |
| 2 | " 14 " " " 1 " 1 improved.                                       |

One man was received 12 times more; and discharged *cured* 7 times, *relieved* five times. His last dischargo was about twelve years since, and during the interval between that time and the present, his habits have been strictly temperate, and his mental condition perfectly healthy.

Of all diseases to which the human race is subject, there is none that more completely unmans its unfortunate victim, more entirely divests him of all the attributes, the possession of which has justified him in assuming the title of "the Lord of Creation," than delirium tremens, when in the plenitudo of its activity.

The quivering tongue, the disordered stomach, the torpid liver, the rapid pulse, the contracted pupil, the inability to sleep, the irregularity of nervous power, the impotent functions of the brain, and the consequent insubordination of the system to its control—these physical symptoms, though much, are but little, when compared with the mental phenomena resulting from them. The depraved action of the avenues to the mind, the external senses, and the unhealthy functions of the perceptive faculties, whence the patient is unable to appreciate or understand the nature or the relations of the objects by which he is surrounded; the entire confusion of his ideas of matter, time and space, the laws by which they are regulated, and the inevitable results of those laws, if not the least alarming are certainly less

prominent and imposing than some of the other symptoms. These may be called the negative mental phenomena. The positions are more salient, and hence make a stronger impression upon the beholder. They are the visions which are continually conjured up by a wayward, excited and ungovernable imagination, more varied in their forms and characters than are the designs of the artist, more diverse and unstable than the ever-changing pictures of a phantasmagoria. The walls of his apartment, mere mortar and whitewash to the view of other people, present to the patient pictures of every possible variety in character and composition. Animals of various kinds throng into his room, crouch before him, with threatening gestures, and grimaces the most frightful, creep beneath his bed or crawl upon it with torturing menaces. Enemies in human form spring up to bind, to drag to prison, to the tribunal of justice, to the rack, or to the place of execution, or perchance to shoot or to slay with the sword; and, finally, the phantoms of the ideal world, spectres with gorgon heads, and bodies more hideous than those of the satyr or the fabled tenants of the lower regions, glower upon him with their eyes of fire, gnash their teeth in fiendish defiance, at length seize upon him, and he struggles with them in the full faith that he has encountered the devil incarnate.

Such are the features which constitute the most distinctive, and to some the most appalling characteristics of this disease. How beautiful the results of the harmonious movements of that system which, as the crowning work of the creation, was both "fearfully and wonderfully made;" yet how revolting the effects of its discordant action!

But, as has already been observed and demonstrated, notwithstanding the remarkable physical disorder, and the heterogeneous medley of mental phenomena, attendant upon the malady in question, there are but few acute diseases involving any important organ or series of organs, which are more curable. The physical powers, though so nearly prostrate, rise with a resiliency truly remarkable, and the mind rapidly resumes the powers of its healthy action.

There are few, if any, diseases, the rules for the treatment of which are less clearly defined than delirium tremens. Perhaps there is none in which the system of medication is less uniform in the hands of different practitioners.

The treatment formerly pursued at this institution, may be inferred from the following synopsis of the prescriptions for ten patients, admitted at different periods, from 1821 to 1844.

1. Tartar emetic, Epsom salts, and the warm bath.
2. Epsom salts and tartar emetic.
3. Laudanum.
4. Opium and hellebore.
5. Opium, hellebore, and serpentaria.
6. Laudanum, tincture of hellebore, infusion of chamomile and valerian.
7. Calomel, senna, and the infusion of valerian.
8. Camphor, opium and wine.
9. Calomel, opium, camphor, infusion of chamomile and valerian.
10. Calomel, Dover's powder, and castor oil.

It has been already observed that delirium tremens is not usually considered as ranking under the general head of insanity proper. What opinion soever may be entertained upon this subject, the malady is so different from ordinary mental alienation, in both its characteristics and its duration, that the therapeutic principles adapted to the treatment of the

former are entirely inapplicable to the latter. Hence, as well as for reasons hereafter to be mentioned, we have ever held the opinion—and it has been very strongly confirmed by the practical observation of several years—that cases of delirium tremens ought not to be admitted into institutions intended for the insane.

The disease is of short duration, and consequently the patient requires *absolute* seclusion, or close confinement for but a limited period. The converse of this proposition, as a general rule, obtains with the insane. The internal police of an asylum cannot, therefore, be adapted to the necessities of the two classes. The supervision, the restraint, the abridgment of liberty necessary for the one, are not so for the other. If the delirium patients, after recovery from the immediate effects of the disease, be allowed to have all the privileges to which they are entitled, compatible with their condition, ill feeling and jealousy are engendered among the insane, to whom those privileges cannot safely be extended.

It is to be hoped that the State, hitherto so watchful of the interests of the insane, the deaf and dumb, and the blind, within its jurisdiction, and so liberal in its appropriations for their benefit; will, at no distant period, establish an institution for the intemperate.

Of the many cases which have been admitted into this institution, there have been but comparatively few instances of reform from the habit of intoxication. Such reformation could not be expected from the brief term of seclusion to which the patients are subjected. Accustomed, as the persons have been, in most cases, for many years, to the use of liquor, the whole frame, and particularly the nervous system—these organs so mysterious in their organization, so wonderful in their functions, and so difficult of control—have adapted themselves to the stimulus to such a degree, that it has almost become a matter of necessity. Every system of organs, every organ, every fibre, every ultimate corpuscle which assists in making up the fabric of the body, and lends its agency in prosecuting the phenomena of vitality, has, as it were, obtained an abnormal appetite, which calls loudly and perseveringly for indulgence. Hence the only hope of reformation, in a great majority of cases, lies in a prolonged seclusion, and a compulsory abstinence from stimuli a sufficient length of time to permit a thorough regeneration of the whole frame. If the patient be placed beyond the reach of liquor, in an institution conducted upon the best of hygienic principles; furnished with plain but nutritious food, and take sufficient exercise in some useful manual employment to promote the healthy action of every part of the system, the process of renovation would proceed with considerable rapidity. The absorbents, and all the organs of secretion acting vigorously, would constantly be throwing out of the body the unhealthy particles of which it is composed, while the organs of assimilation would as continually supply their places with new healthy and energetic matter, unaccustomed to the deteriorating effects of stimulus, and capable, without it, of performing with vigour its office in the functions of animal life.